

NOTES ON THE FOOD OF THE LARGEMOUTH BLACK  
BASS, *MICROPTERUS SALMOIDES FLORIDANUS*  
(LeSUEUR), IN A FLORIDA LAKE<sup>1</sup>

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Buck Pond is one of several hundred small solution lakes in the Central Highlands region of Northern Florida. It is fifteen miles east of Mill Dam Lake, Marion County, and lies in the Ocala National Forest. The total surface area of the lake is approximately eighteen acres occupying a basin which is shaped like a figure "eight." A shallow shelf extends out from the shoreline about twenty-five feet. Beyond the edge of this shelf the bottom drops off rapidly to a maximum depth of twenty-five feet in the central portions of the lake. The firm sandy bottom of the lake is covered with a thin layer of organic matter derived from the aquatic vegetation which grows only in the shallower portions of the shore zone. No surface streams enter or flow out of Buck Pond and its water remains unstained and quite transparent throughout the year. The only aquatic vegetation observed at the time of this study included species of: *Panicum*, *Leersia*, *Myacca*, *Nymphoides*, *Sagittaria*, *Juncus*, *Pontederia*, and *Hypericum*.

In connection with his studies on fish populations of some small lakes in Florida, Dr. O. Lloyd Meehan, then of the U. S. Fish Hatchery at Welaka, Florida, poisoned the fishes of Buck Pond on July 17, 1941. His results were published shortly thereafter (1942). At Dr. Meehan's suggestion I collaborated in the field work at Buck Pond and obtained there the data presented in this paper.

APPLICATION OF POISON

The poison used was derris powder with 5% Rotenone content, mixed with water to form a thin paste, then further diluted until thin enough to use with a spray nozzle. Sufficient derris was applied to give a mixture of .5 parts per million in the lake. The poison was distributed uniformly by the use of an orchard type pump mounted on a fifty gallon drum. This equipment was placed in an eighteen foot sponson canoe powered with an outboard motor. The first treatment was begun at nine o'clock in the morning and the entire shore zone was sprayed. After this vegetation zone was covered the nozzle was removed and the end of the hose placed just

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in front of the outboard motor propeller. Then the remainder of the lake was treated while making decreasing circular patterns with the canoe. Immediately afterwards a second application of poison was sprayed on the vegetation zone. The entire process of applying the derris took about three hours.

#### OBSERVATIONS AND RESULTS

The unusual results obtained on the food of the largemouth black bass in Buck Pond can be understood more clearly with the aid of the following observations from my field notes presented in chronological order.

Spraying with derris commenced at nine o'clock in the morning. Five minutes later bass were observed striking at affected fishes in the vegetation zone. Fifteen minutes after spraying began many suckers were seen jumping out of the water onto dense mats of vegetation at the bases of *Hypericum* plants and some jumped out onto the shore. Bass, bluegills, shell-crackers and warmouth bass were noticeably affected at approximately 9:45 A. M. At this time also many partially digested regurgitated sunfishes and suckers were observed on the lake bottom at depths of four to ten feet. Some severed heads and bodies of sunfishes and suckers were likewise seen lying on the bottom. At six o'clock in the afternoon the inflated air bladders of fifteen suckers were counted floating, fully inflated, on the surface of the lake. Two softshell turtles, *Amyda ferox* (Schneider), were seen at this time swimming crazily around in the middle of the lake with their heads above water. Between six and seven o'clock, approximately nine hours after poisoning began, *Hololepis* was observed at the surface for the first time. Three to four hundred of these darters were seen in the open waters of the lake swimming around in small circles with their snouts breaking the surface of the water. No other species of fish was seen alive at this time.

The bass obtained were measured and weighed, and the stomach contents preserved in a 10% formalin solution. To aid in identification of stomach contents, a synoptic collection was obtained of all species of fishes found in the lake. Dying and dead fishes were collected and preserved during and after completion of the poisoning with the help of volunteers from a local CCC camp. One hundred and twenty bass were obtained on July 17 and an analysis of the stomach contents of one hundred and ten individuals containing

food is presented in Table 1. The following list shows the species composition of this lake habitat and the first five forms are arranged in descending order of abundance as based on total fishes recovered after poisoning.

1. *Erimyzon sucetta sucetta* (Lacépède)—Eastern Lake Chub-sucker
2. *Lepomis macrochirus purpurescens* Cope—Eastern Bluegill
3. *Lepomis microlophus* (Günther)—Shell-cracker
4. *Chaenobryttus coronarius* (Bartram)—Warmouth Bass
5. *Micropterus salmoides floridanus* (LeSueur)—Florida Large-mouth Bass
6. *Gambusia affinis holbrookii* (Girard)—Eastern Mosquito-fish
7. *Heterandria formosa* Agassiz—Least Killifish
8. *Labidesthes sicculus vanhyningi* Bean and Reid—Southeastern Brook Silverside
9. *Hololepis barratti* (Holbrook)—Florida Swamp Darter
10. *Fundulus dispar lineolatus* (Agassiz)—Eastern Star-headed Minnow
11. *Fundulus chrysotus* Holbrook—Golden Topminnow

#### DISCUSSION OF FOOD AND FEEDING

The effects of poisoning on Buck Pond fishes present some interesting facts on the feeding habits and food of largemouth bass. A much higher percentage of stomachs contained food (92%) than was reported for the stomachs of bass from the St. Johns River (68%) (McLane, 1948), which were not obtained by use of poison. Though evidence was found of some cases of regurgitation this factor was much lower than is experienced when using more conventional methods of obtaining bass. The severed heads and cutup bodies of fishes seen on the bottom are attributed to the feeding activities of the soft-shelled turtles, which, though they were affected by derris, apparently fed to some extent on the affected fishes before succumbing themselves.

An examination of the data in Table 1, augmented by the field observations presented, shows that the bass fed quite heavily on all species of fishes known to occur in Buck Pond, except *Fundulus chrysotus*. It appears that the bass captured food in all the different ecological situations present. However, the strikingly high percentage of darters in the stomachs is probably due to distortion of

	TOTAL ORGANISMS	NO. STOMACHS	AV. PER FISH	MAX. (ONE FISH)	AV. SIZE (STAND. LENGTH MM)
LIST OF ORGANISMS EATEN					
Decapoda	3				
Palaemonetes paludosa	1	1	.01	1	
Procambarus fallax	2	2	.02	1	
Odonata	5				
Undet. nymphs	2	2	.02	1	
Undet. adults	3	3	.03	1	
Orthoptera	1				
Opshomala v. vitreipennis	1	1	.01	1	
Coleoptera	2				
Phyllophaga sp.	1	1	.01	1	
Hypotruchia sp.	1	1	.01	1	
Undet. insects	1	1	.01	1	
Araneida	2				
Dolomedes t. triton	2	1	.02	2	
Pisces	988				
Erimyzon s. sucetta	2	1	.02	2	133.5
Lepomis m. microlophus	3	3	.03	1	82.0
Micropterus s. floridanus	3	3	.03	1	35.5
Centrarchids (undet.)	8	5	.07	4	28.3
Chaenobryttus coronarius	8	8	.07	1	47.6
Fundulus dispar lineolatus	12	11	.11	2	26.4
Heterandria formosa	24	4	.21	10	13.7
Undet. fish	50	29	.45	7	30.8
Lepomis m. purpureus	50	34	.45	4	45.8
Lepomis sp.	56	27	.51	5	31.0
Gambusia a. holbrookii	69	30	.63	9	18.6
Labidesthes s. vanhyningi	203	50	1.83	31	32.0
Hololepis barratti	500	62	4.55	47	18.5
Miscellaneous	16				
Fish eggs	16	3	.14	1	
Myacca sp.		1			
Detritus		5			
Total food organisms	1018				

TABLE 1

Food of 110 specimens of *Micropterus salmoides floridanus* (LeSueur), 101-470 millimeters in fork length, from Buck Pond, Marion Co., Florida.

the normal feeding pattern by the poisoning of the water. *Hololepis* is a quiescent, bottom-dwelling form seldom found in bass stomachs. None of the five hundred individuals eaten in the present case had been extensively digested, and it seems evident that they were captured as they rose from the bottom or gasped at the surface on feeling the effects of the derris poison. In contrast, the Centrarchids and specimens of *Labidesthes* were found in different stages of digestion. My observations of food of bass from lakes similar to Buck Pond made over a period of years indicate that these latter forms are staples in the normal diet of bass.

The maximum number of fishes eaten by one bass was recorded from a specimen 177 millimeters in fork length, which contained 47 specimens of *Hololepis* with an average standard length of 17 millimeters and 1 *Gambusia* 15 millimeters long—a combined total of 814 millimeters. Nine of the specimens of *Hololepis* were examined and the following organisms recorded from their stomachs: 82 *Chaoborus* sp., 37 *Chydorus* sp., 15 *Cyclops* sp., 2 Chironomidae, and 2 Amphipoda.

A total of 988 fishes were consumed by the 110 bass, giving an average of 8.98 fishes per bass. By contrast, in the St. Johns River I found (1948) that the average number of fishes eaten per bass was 1.14. The extremely high ratio found in Buck Pond (due primarily to the consumption of *Hololepis*) shows how derris poisoning may alter the results of a food study by increasing the availability of food items that are not normally present in the diet of the largemouth black bass.

#### SIZE GROUPS

In addition to the 120 bass examined for stomach contents, 222 specimens, some of which floated to the surface during the night and were recovered on July 18, contributed to the length-frequency data presented in Figure 1. The smallest bass obtained measured 101 millimeters and may represent the minimum growth of bass hatched during the 1941 (?) breeding season. Eighty-eight per cent of the 342 bass fall in the first two size groups, whereas only 12 per cent represent bass weighing one pound or more which were available to anglers up until the time of poisoning. Buck Pond with only 2.2 desirable bass per acre may represent a body of water that has been effectively fished by anglers, or was intrinsically low in productivity.

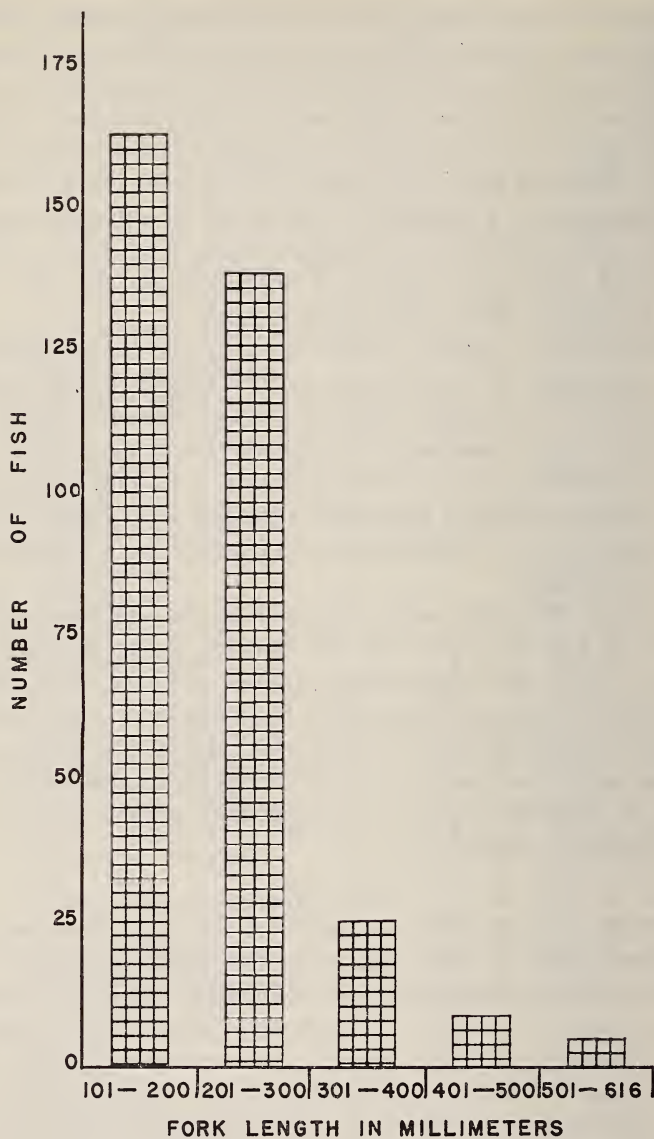


FIGURE 1

Size distribution of 342 specimens of *Micropterus salmoides floridanus* (LeSueur) from Buck Pond, Marion Co., Florida.

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## LITERATURE CITED

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